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(54) Lung and chest exerciser

(57) A lung and chest exerciser, collects some of the air expired from the lungs on an outbreath to be breathed back into the lungs on the next inbreath together with some fresh air so that the lungs have to open deeper or more often to receive an equivalent amount of fresh air. It comprises a body (a), a mouthpiece (e) with teeth grips (f), a collector bag (c), a slider (s) to adjust the bag volume, a filter d which resists air flow and a nosepiece b. The nosepiece is preferably of foam which is displaceable to act as a valve. The exerciser directly develops the lungs and the respiratory muscles and indirectly exercises the heart affecting the body's metabolism, circulation and relaxation level.

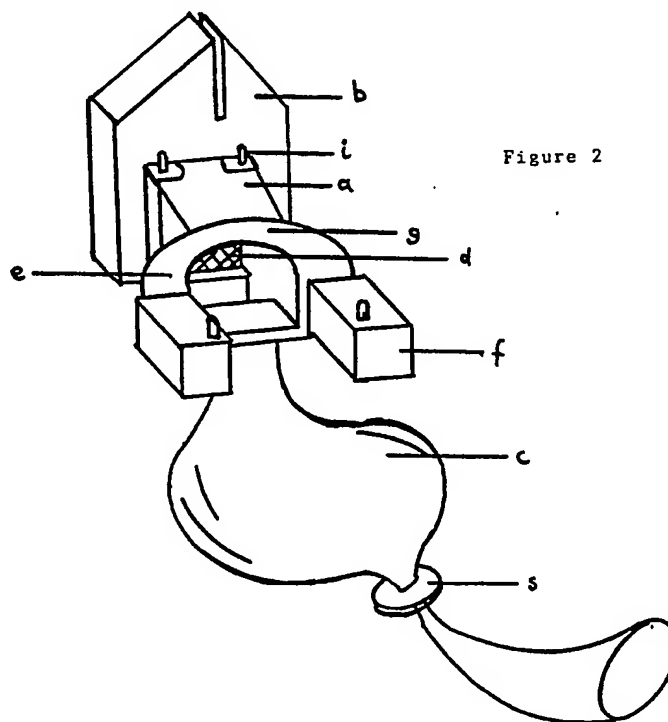


Figure 2

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Figure 1 |

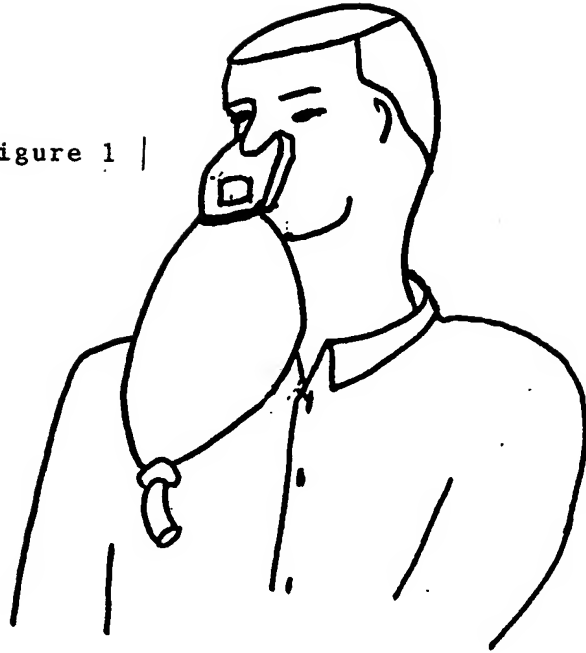
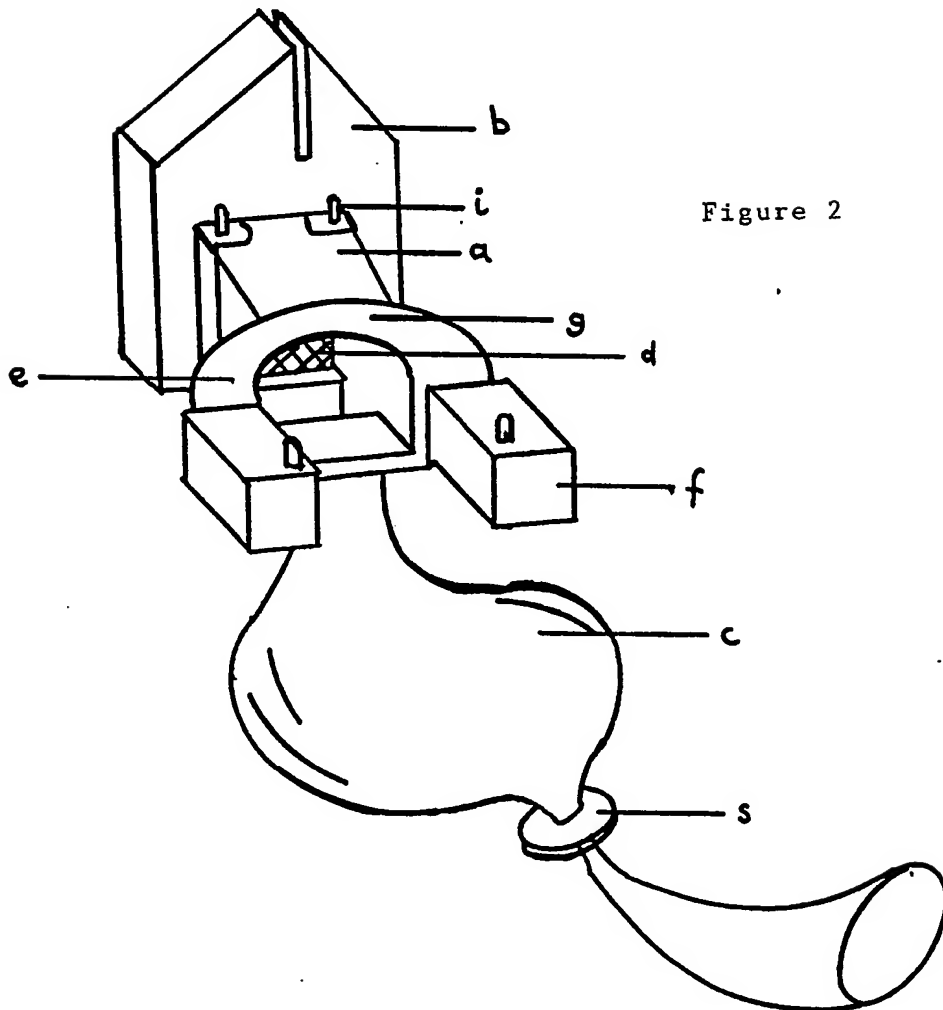


Figure 2



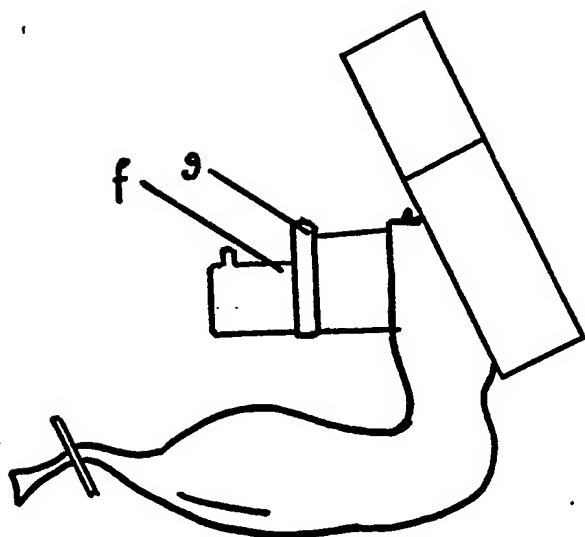


Figure 3 |

Figure 4

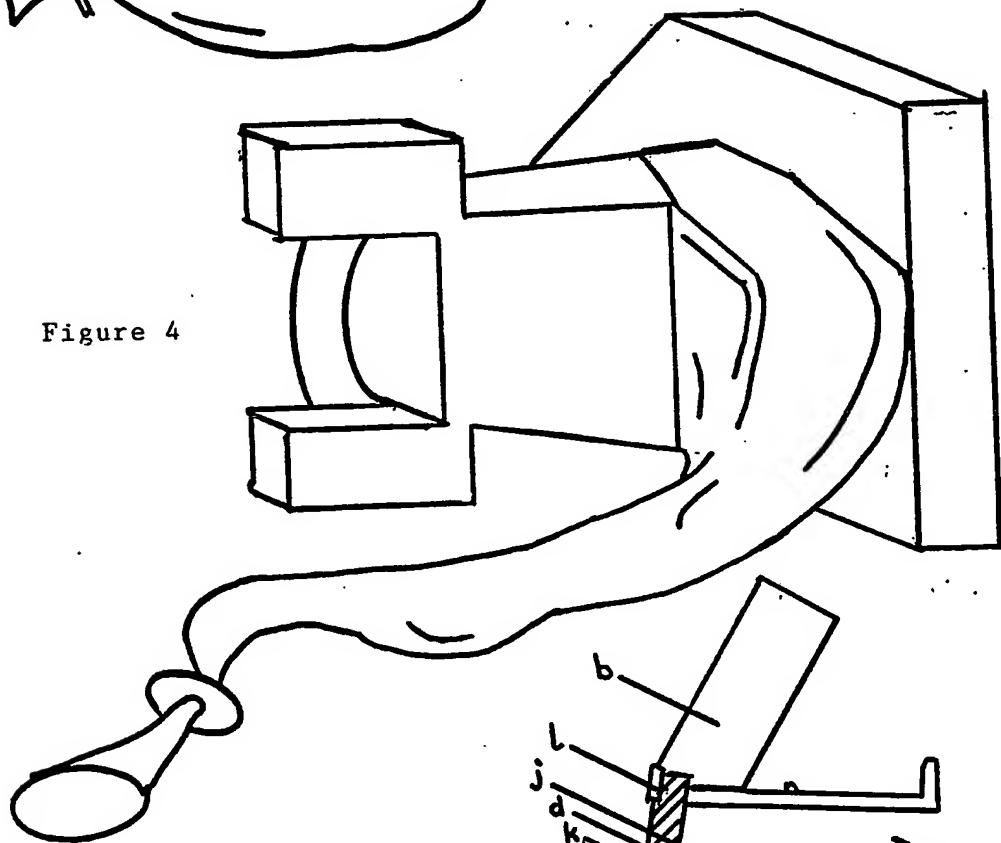


Figure 5

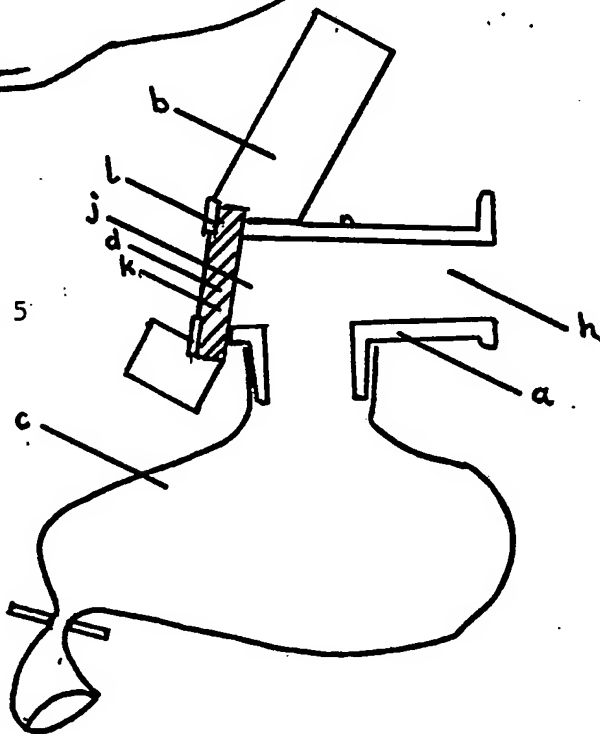


Figure 6

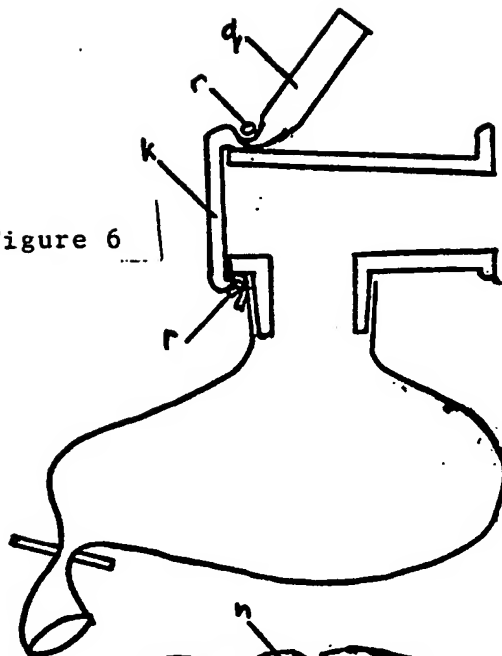


Figure 7

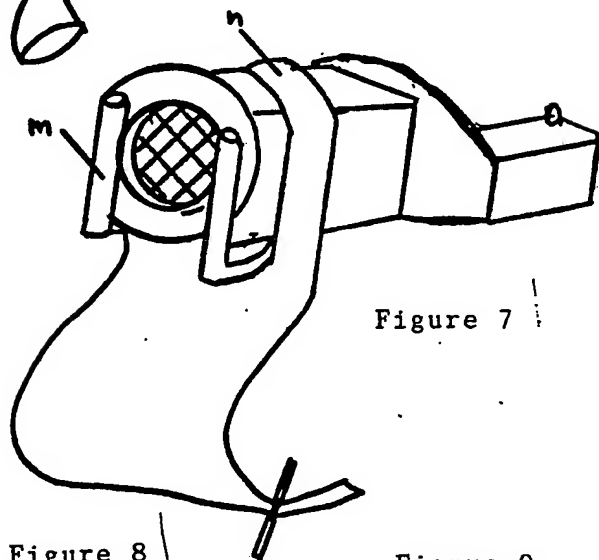


Figure 8

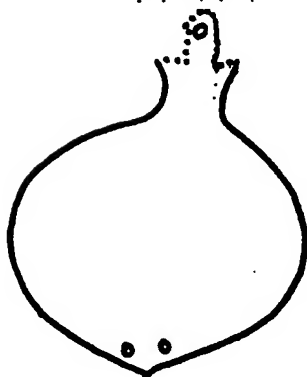
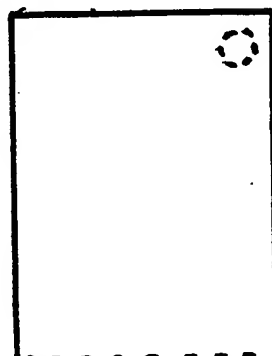


Figure 9



A lung and chest exerciser and developer.

This invention relates to a device for the exercise and development of the lungs and chest. The device will be referred to as a "lung developer".

There are currently devices available that indirectly exercise the lungs by exercising some separate bodily activity, such as an exercise bicycle or a rolling road. There are devices for exercising the chest muscles, such as chest expander springs and free weights. This device exercises the lungs, and chest and stomach muscles directly.

The lung exerciser also affects the blood's CO_2 level which may be of medical use.

The aim of the present invention is to provide a device that arranges for some of the air expired from the lungs on an out-breath to be collected and then to be breathed back into the lungs on the next in-breath together with some fresh air.

By so arranging, to receive a mix of expired and fresh air the lungs have to open deeper or more often to receive an equivalent amount of fresh air.

In the embodiment set out later the lungs may breath back in all the collected expired air before breathing-in fresh air, causing the lungs to open deeper or, on a different setting, the lungs may breath in a mixture of expired air and fresh air thus allowing the lungs to open more frequently.

An embodiment of the invention will now be described solely by way of example and with reference to the accompanying drawings.

Diagram 1 shows a person using a lung exerciser
Diagram 2 shows a general view of a lung exerciser
Diagram 3 shows a side view
Diagram 4 shows an underview

Diagram 5 shows a cross section taken along the central vertical axis.

The lung exerciser consists of a body (a), a nosepiece (b), a collector bag (c) and a filter/valve (d).

The body (a) has a mouthpiece (e) shaped rather like a snorkel tube's mouthpiece with lugs (f) for the person's teeth to grip and a protruding rim (g) for the person's lips to go around. The mouthpiece has an airway (h). This airway may be central or to one side so that a person might find it easier to open their mouth whilst still gripping the lung exerciser. The mouthpiece may have a protruding lip to reduce saliva trickling into the airway.

The airway leads into a collector bag (c). This bag is airtight. It is inflated by the person breathing out down the airway. The collector bag may be a plastic bag. On it may be volume calibrations and there may be printed advice or a decorative pattern.

The collector bag may be attached to the body by means of a rubber band. The bag may be attached to the body by sliding over part of the body and then fixing onto hooks protruding from the body (i diagram 2) or by looping over the body (n diagram 7). Diagram 8 shows the template of a collector bag suitable for use with fixing hooks and diagram 9 shows the template of a collector bag suitable for looping over the body. The edges of the template are sealed except for where the outline is a dotted line where the two sides of the bag are left open.

The bag may be of a design such that its volume can be altered by attaching various amounts of the bag to the body.

Connected to the collector bag is another airway (j) which leads to the filter and valve (d). This airway may be part of the body. The filter cleans air that travels through the airway.

The valve may be a constriction in the air passage which may be variable or may be the resistance due to the filter material. In the embodiment shown the valve consists of filter material (k) which is held in place by the washer (l) which fits behind lugs (m, see diagram 7). Filter material may be chosen such that with a single thickness the air resistance is such that on an inbreath some air is drawn through the filter at the same time as air is drawn up from the collector bag providing a blend of fresh and exposed air and such that with a double thickness of filter material the air resistance is such that on an inbreath all the air in the collector bag is breathed in before air is drawn through the filter.

Integral to the body (a) or attached to it is a nosepiece (b). This has two protuberances that rest on either side of the person's nostrils.

The nose piece restricts flow of air up or down the nostrils either by holding the nostrils closed or by blocking them. The material of the nosepiece may be selected so that only light pressure is placed on the nostrils. Expanded polyurethane foam is a suitable such material.

By using a light pressure the person may, if they wish, over ride the nosepiece and breath air up or down their nose. Typically this may be done by blocking the air passage (h) with the person's tongue and taking a firm breath.

The nosepiece may have a fabric cover or a cover of absorbant material for extra comfort.

The nosepiece may be attached to the body on lugs protruding from the body or by using a rubber band or by going around the body.

Diagram 7 shows the lung exerciser with nosepiece removed.

The nosepiece and air filter may be made from one piece of foam. Such an arrangement is shown in diagram 6. This shows a cross-sectional view along a vertical axis. The piece of foam (q) which makes up the nosepiece (b) and provides the filter materials (k) is held in place by clip (r).

It is appreciated that the embodiment of the invention described above with reference to the accompanying drawings has been given by way of example only^{and} that modification may be effected.

For example instead of having a snorkel - type mouthpiece gripped by the teeth a face mask may be used similar to ones used for gas masks or for dust masks. These masks may have speak through panels.

The snorkel type mouthpiece may have lugs or clamps that locate securely onto a person's teeth. A person might then be able to freely open their mouth with the lung exerciser staying in place. The exerciser may fit around a person's nose, so that they breathe through their nose.

The mouthpiece may be without lugs.

The lung exerciser may be used without the nosepiece.

The lung exerciser may be designed so that it is easy to wash.

The filter may be quickly renewable.

The collecting bag (c) may be of a material or have corrugations moulded into it so that it is silent and does not close up on itself during use.

On the collector bag may be used a slider (s) to quickly alter the usable volume.

Attached to (s) may be a small plastic bag into which the unused part of the collector bag may be stored.

Attached to the lung exerciser may be various meters.

These may measure the volume of air expired, its pressure, measure the oxygen or carbon dioxide content of the inhaled or exhaled air, measure a person's pulse or blood pressure or measure their body temperature. Attached to these meters may be alarm warnings and failsafe mechanisms.

A person's blood sugar levels may be measured.

There may be a means of administering pharmaceuticals to the air collected.

A counting mechanism could be fitted to count the number of breaths.

The body (a) may have a cushioned pad attached to it to rest against a person's chin.

The collector bag may be part or wholly constructed of a material that is air permeable. By using such material the air filter and valve may be dispensed with. The body may be shaped to keep part of the collector bag extended on an inbreath.

The lung exerciser may be adapted for animals, in particular a face mask may be developed for race horses and greyhounds.

The lung developer is especially advantageous in the way it directly develops the lungs and chest and stomach muscles, its ease of usage, its adaptability and economic outlay.

The lung developer may be sold under the name the "Hepburn lung exerciser".

Claims

1. A respiratory device comprising a bag having a mouthpiece through which air can be inhaled from the bag and exhaled to the bag, and valve means through which the mouthpiece is connected to atmosphere, the valve means providing a resistance to air flow, whereby appreciable quantities of fresh air will only be drawn through the valve means from the atmosphere when the differential pressure on the two sides of the valve means is sufficiently high.
2. A device as claimed in claim 1 wherein the valve means operates at such a differential pressure that a person can use the device for extended periods of time without adjustment and without feeling breathless.
3. A device as claimed in claim 1 wherein fresh air passes through a filter before being admitted to the device.
4. A device as claimed in claim 1 wherein the entrance to the bag that collects the exhaled air will close upon a sharp inbreath.
5. A device as claimed in claim 1 wherein the airways in the mouthpiece have a cross-section of at least 1cm^2 .
6. A device as claimed in claim 1 wherein an inbreath causes the bag to be emptied of air before air is drawn in from the atmosphere.
7. A device as claimed in claim 1, wherein the valve means is provided in the mouthpiece and comprises an air filtering device providing a resistance to air flow through it.
8. A device as claimed in claim 1, wherein the mouthpiece comprises an unitary structure with a nose-piece device for restricting airflow through the nose of the user.
9. A device as claimed in claim 1, wherein means are provided on the bag to vary its volume for receiving air.
10. A device as claimed in claim 1 that causes a person to breathe deeper or more frequently or both while they are using the device.
11. A device as claimed in claim 1 that minimises the amount of CO_2 expelled from the body.
12. A device as claimed in claim 1, wherein the device is suitable for race horses or greyhounds or other animals.
13. The processes for humans or animals of exercising the respiratory muscles, or of developing respiratory ability, or of causing exercise of the heart and development of the circulation, or of increasing metabolism, or of causing mental or physical relaxation or of reducing bodily tensions or of promoting tissue regrowth, or of affecting blood CO_2 and O_2 levels by sustained breathing into a bag as claimed in claim 1.
14. A device as claimed in claim 1 wherein the device has a nose-piece, or an adjustable bag volume, or can be held by the teeth, or has a mouthpiece that requires the intentional use of the lip muscles to form an air seal, or has instruments, or has a warning system or is substantially as described herein with reference to figures 1-9 of the accompanying figures.

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